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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/572,935  
Applicant : Guenther HAMBITZER et al  
Filed : March 22, 2006  
TC/A.U. : 1745  
Examiner :

Docket No. : 2945-176  
Customer No.: 6449  
Confirmation No.: 4983

**SUBMISSION OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

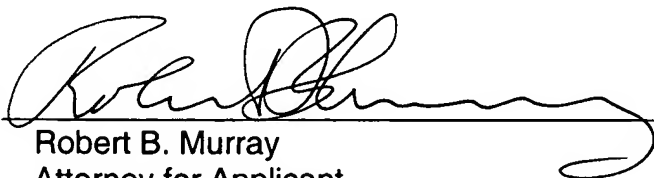
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

Submitted herewith is a copy of the translation of the International Preliminary Report on Patentability.

In the event that any fees are due with this paper, please charge our Deposit Account No. 02-2135.

Respectfully submitted,

By 

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RBM/cb

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference HAM 118/OA/WO	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/DE2004/002105	International filing date ( <i>day/month/year</i> ) 21 September 2004 (21.09.2004)	Priority date ( <i>day/month/year</i> ) 23 September 2003 (23.09.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant HAMBITZER, Günther		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 15 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input checked="" type="checkbox"/> | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application   |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Date of issuance of this report 09 January 2007 (09.01.2007)
Facsimile No. +41 22 338 82 70	Authorized officer <div style="text-align: center; font-weight: bold; margin-top: 10px;">Ellen Moyse</div> e-mail: pt05@wipo.int

# PATENT COOPERATION TREATY

TRANSLATION

From the  
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	<b>See Form PCT/ISA/210 (sheet 2)</b>
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Applicant's or agent's file reference <b>HAM 118/OA/WO</b>	FOR FURTHER ACTION See paragraph 2 below
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International application No. <b>PCT/DE2004/002105</b>	International filing date (day/month/year) <b>21.09.2004</b>	Priority date (day/month/year) <b>23.09.2003</b>
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International Patent Classification (IPC) or both national classification and IPC  
**H01M10/36, H01M10/40**

Applicant  
**HAMBITZER, Günther**

1. This opinion contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the opinion
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input checked="" type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP	Authorized officer
Facsimile No.	Telephone No.

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Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐

This opinion has been established on the basis of a translation from the original language into the following language

\_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐

a sequence listing

☐

table(s) related to the sequence listing

b. format of material

☐

in written format

☐

in computer readable form

c. time of filing/furnishing

☐

contained in the international application as filed.

☐

filed together with the international application in computer readable form.

☐

furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. IV

Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:
- ☐ paid additional fees
- ☒ paid additional fees under protest
- ☐ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with
- ☒ not complied with for the following reasons:

1 The different groups of invention are as follows:

- Group 1: Claims 1-9, 30-34

A battery cell with an SO<sub>2</sub>-based electrolyte and a space between the positive electrode and the negative electrode, the space being formed in such a manner that when the cell is being charged, any active material deposited on the negative electrode can come into contact with the positive electrode such that locally limited short-circuit reactions occur on the surface thereof.

- Group 2: Claims 10-19, 30-34

A method for producing a battery cell, in which hydroxide ions are removed from the surface of an electrode in order to optimise said

(continued in Supplemental Box)

4. Consequently, this opinion has been established in respect of the following parts of the international application:



all parts



the parts relating to claims Nos. \_\_\_\_\_

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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	10-16, 20, 21, 27	YES
	Claims	1-9, 17-19, 22-26, 28-34	NO
Inventive step (IS)	Claims	10-16, 20, 21	YES
	Claims	1-9, 17-19, 22-34	NO
Industrial applicability (IA)	Claims	1-34	YES
	Claims		NO
2. Citations and explanations:			
2	<p>Reference is made to the following documents:</p> <p>D1: WO 00/44061 A (FORTU BAT BATTERIEN GMBH; HAMBITZER, GUENTHER; KREIDLER, BERND; DOERFL) 27 July 2000 (2000-07-27)</p> <p>D2: DE 101 10 716 A1 (FORTU BAT BATTERIEN GMBH) 12 September 2002 (2002-09-12)</p> <p>D10: EP-A-O 468 942 (HER MAJESTY THE QUEEN, IN RIGHT OF THE PROVINCE OF BRITISH COLUMBIA; M) 29 January 1992 (1992-01-29)</p> <p>D12: EP-A-O 767 506 (BATTERY ENGINEERING INC; WILSON GREATBATCH LIMITED) 9 April 1997 (1997-04-09)</p>		
3	NOVELTY (PCT Article 33(2))		
3.1	<p>The present application does not satisfy the criteria of PCT Article 33(1) because, irrespective of the lack of clarity mentioned below, the subject matter of independent claim 1 is also not novel within the meaning of PCT Article 33(2), so the requirements of PCT Article</p>		

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

33(1) are not met.

3.1.1 Document D1 discloses (the references between parentheses apply to said document):

- a battery cell with an electrolyte based on  $\text{SO}_2$  and with a space between the positive electrode and the negative electrode, the space being formed in such a manner that when the cell is being charged, any active material deposited on the negative electrode can come into contact with the positive electrode such that locally limited short-circuit reactions can occur on the surface thereof (page 3, line 16 - page 5, line 29).

3.1.2 Claims 2-9 and 30-34 do not contain any features that, in combination with the features of any claim to which they refer, meet the PCT requirements in respect of novelty.

3.2 The present application does not satisfy the requirements of PCT Article 33(1) because the subject matter of independent claims 17 and 19 is not novel within the meaning of PCT Article 33(2).

3.2.1 Document D10 discloses (the references between parentheses apply to said document):

- an insertion electrode for an electrochemical battery cell, the surface of said electrode being substantially free of hydroxide ions, and an electrochemical battery cell containing said insertion electrode (claims 1, 15-19, 21, 22, 32).

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Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

3.2.2 Independent claims 18 and 30-34 do not contain any features that, in combination with the features of any claim to which they refer, meet the PCT requirements in respect of novelty.

3.3 The present application does not meet the requirements of PCT Article 33(1) because the subject matter of independent claim 22 is not novel (PCT Article 33(2)).

3.3.1 Document D12 discloses (the references between parentheses apply to said document):

- A method for producing an electrochemical battery cell, comprising a step in which an SO<sub>2</sub>-based electrolyte is filled together with a conducting salt into the housing. After filling with the electrolyte solution, a coating layer is formed on the negative electrode, said coating layer containing the active metal of the cell, in which the cell is optimised, in respect of the reduction in discharge capacity resulting from the formation of the coating layer, by the active metal required for forming the coating layer being transferred from an additional supply to one of the electrodes, whereby the additional supply is in contact with the electrolyte, an auxiliary electrode is in electrically conductive contact with the electrolyte, an electrically conductive connection is produced between the auxiliary electrode and the electrode to which the active metal is to be transferred, and the active metal



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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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is transferred from the additional supply to the electrode by an electrical current flowing between the auxiliary electrode and the electrode to which the active metal is transferred (column 3, lines 1-20; column 3, line 40 - column 4, line 31; claims 1, 5, 6, 9-12, 18-23).

3.3.2 Dependent claims 23-34 do not contain any features that, in combination with the features of any claim to which they refer, meet the PCT requirements for novelty or inventive step.

4 INVENTIVE STEP (PCT Article 33(3))

4.1 Document D10 is considered the prior art closest to the subject matter of independent claim 10. It discloses (the references between parentheses apply to said document):

- A method for producing an electrochemical battery cell, in which hydroxide ions are removed from the surface of an electrode by washing and subsequent heating to 600°C, in order to optimise said electrode (claims 1, 15-19, 21, 22, 32).

4.1.1 The subject matter of claim 10 therefore differs from the known method in that a cleaning agent containing a first cleaning component that reacts with hydroxide ions is brought into contact with the electrode in such a manner that hydroxide ions bound to the electrode are dissolved from the electrode surface by reaction with the first

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Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

cleaning component, and components of the cleaning agent or reaction products which disturb the working of the cell are removed from the electrode.

4.1.2 The technical effect of this method is considered to be that of removing hydroxide ions from the surface.

4.1.3 The problem to be solved by the present invention can therefore be considered that of presenting an alternative method for surface activation of the electrode.

4.1.4 The solution to this problem as proposed in claim 10 of the present application is based for the following reasons on an inventive step (PCT Article 33(3)):

- A method for removing hydroxide ions from the surface of an electrode by means of a cleaning agent that contains a cleaning component is neither known from nor rendered obvious by the prior art. It is also evident from the description of the present application that much lower concentrations of hydroxide ions can be achieved with this method than with known methods.

4.2 Claims 11-16 depend on claim 10 and therefore likewise meet the PCT requirements for novelty and inventive step.

4.3 Document D2 is considered the closest prior art to

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Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

the subject matter of independent claim 20. It discloses (the references between parentheses apply to said document):

- A method for producing an electrochemical battery cell, comprising one step in which an electrolyte solution base on SO<sub>2</sub> is filled with a conducting salt into the housing, whereby either the ready-made electrolyte solution is filled into the housing, or the finely ground conducting salt is first filled into the battery housing and subsequently gassed with SO<sub>2</sub> (paragraphs 23, 24).

4.3.1 The subject matter of claim 20 therefore differs from the known method in that the inner chamber of the housing is filled with gaseous SO<sub>2</sub>, the filling opening of the housing is connected gas-tight to a vessel containing the electrolyte with a proportion of SO<sub>2</sub> measured such that the gaseous SO<sub>2</sub> is eagerly dissolved and the electrolyte is driven into the housing by the underpressure resulting from dissolution.

4.3.2 The technical effect of this method is considered to be that the electrolyte penetrates especially well into the pores of the electrodes.

4.3.3 The technical problem to be solved by the present invention can therefore be seen as presenting an alternative method for filling the battery cell with electrolyte solution.

4.3.4 The solution to this problem as proposed in claim 20 of the present application is based for the following reasons on an inventive step (PCT Article 33(3)):

- A method for filling a battery housing by

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Box.No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement
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filling with gaseous SO<sub>2</sub> and subsequent suction of an electrolyte solution into the housing due to the underpressure resulting from dissolution has the advantage that the electrolyte is sucked into all pores that are also filled with gaseous SO<sub>2</sub>, without the disadvantages of other underpressure methods occurring (formation of bubbles due to vaporisation of the solution). This method is neither known from nor rendered obvious by the available prior art.

- 4.4 Claim 21 depends on claim 20 and therefore likewise meets the PCT requirements for novelty and inventive step.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

- 5 The application does not satisfy the requirements of PCT Article 6 because independent claim 1 is not clear.
- 5.1 Claim 1 is not clear and fails to satisfy the criteria of PCT Article 6 to the extent that the subject matter for which protection is being sought is not clearly defined. The claim attempts to define the subject matter in terms of the result to be achieved, but in doing so merely states the problem to be solved, without proposing the technical features necessary for achieving said result. However, the description contains indications of how the invention is technically implemented. Although such claims are not permitted, it was thus possible to search the claimed invention.
- 5.2 Independent claims 10, 17, 20 and 22 relate via use of the optional expression "in particular" to other claims and therefore to a lack of clarity within the meaning of PCT Article 6. Said expression does not restrict the extent of protection conferred by the respective claim.

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: IV

electrode. A cleaning agent containing a first cleaning component that reacts with hydroxide ions is brought into contact with the electrode in such a manner that hydroxide ions bound to it are released from the electrode surface by reacting with the first cleaning component, and components of the cleaning agent or reaction products which could disturb the working of the cell are removed from the electrode, as well as an insertion electrode produced by this method and a battery cell containing such an insertion electrode.

- Group 3: Claims 20, 21, 30-34

A method for producing a battery cell, comprising a step in which an electrolyte solution based on  $\text{SO}_2$  is introduced into the housing with a conducting salt in the following manner:

- the inner chamber of the housing is filled with gaseous  $\text{SO}_2$ ;
- the filling opening of the housing is connected gas-tight to a vessel containing the electrolyte with a proportion of  $\text{SO}_2$  measured such that the gaseous  $\text{SO}_2$  is eagerly dissolved;
- the electrolyte, driven by the underpressure resulting from dissolution, is allowed to flow into the housing.

- Group 4: Claims 22-29, 30-34

A method for producing a battery cell, comprising

Supplemental Box

a step in which an SO<sub>2</sub>-based electrolyte is filled together with a conducting salt into the housing. After filling with the electrolyte solution, a coating layer is formed on the negative electrode, said coating layer containing the active metal of the cell due to the active metal required for forming the coating layer being transferred from an additional supply to one of the electrodes, whereby the additional supply is in contact with the electrolyte, an auxiliary electrode is in electrically conductive contact with the electrolyte, an electrically conductive connection is produced between the auxiliary electrode and the electrode to which the active metal is to be transferred, and the active metal is transferred from the additional supply to the electrode by an electrical current flowing between the auxiliary electrode and the electrode to which the active metal is transferred.

1.1 For the reasons stated below, these groups are not so linked as to form a single general inventive concept (PCT Rule 13.1):

- The application contains four different groups of inventions whose single common technical feature is an electrochemical battery cell or components of an electrochemical battery cell and methods for producing electrochemical battery cells and their components. Since electrochemical battery cells are known from the prior art, the application lacks unity of invention within the

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Supplemental Box

meaning of PCT Rule 13.1.

Three groups of inventions (groups 1, 3 and 4) have as a further common technical feature an SO<sub>2</sub>-based electrolyte. Such electrochemical battery cells are likewise known from the prior art, so these groups of inventions likewise lack unity of invention within the meaning of PCT Rule 13.1. Independent claims 10, 17, 20 and 22 relate via use of the optional expression "in particular" to other claims, but said expression does not restrict the scope of protection of the respective claim.

Claims 30-34 relate to the different groups of inventions and are therefore allocated respectively to these groups.